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movements of the ice of the Kara Sea. Besides, he intends to study the natural history and ethnology of that district.

In America, Colonel Gilder is going to resume his work, which was interrupted last winter. He intends to return to Hudson Bay, and to start on his expedition north with the Eskimos of Wager River, with whom he became well acquainted at the time of Schwatka's sledge-journey to King William Land, of which he was a member. He hopes to be able to reach Iglulik, in Fury and Hecla Strait, in the spring of 1888, and Lancaster Sound in the summer or autumn of the same year.

#### NOTES AND NEWS.

THE department of agriculture has issued a paper prepared by Professor Riley, on the defoliation of shade-trees in Washington. The four principal leaf-eaters are the imported elm-leaf beetle, the bag-worm, the white marked tussock moth, and the fall web-worm. The beetle, Professor Riley says, has done much mischief in the old world. It was first imported here in 1837, and its earlier destructive attacks were notably about Baltimore and New Jersey. The bag-worm for two or three years has been on the increase in special localities in Washington. Speaking of the enemies of these worms, he says, "The 'pellets' of a screech-owl found in the vicinity of Baltimore consisted apparently almost entirely of the hairs of these caterpillars, proving that this useful bird has done good service. Perhaps the statement may be of interest that this little owl is getting much more common in the vicinity of cities in which the English sparrow has become numerous, and that the imported birds will find in this owl as bold an enemy as the sparrow-hawk is to them in Europe, and even more dangerous, since its attacks are made toward dusk, at a time when the sparrow has retired for the night, and is not as wide awake for ways and means to escape. If our two cuckoos, the black-billed and yellow-billed species, could be induced to build their nests within the city limits or in our parks, we should gain in them two very useful friends, since they feed upon hairy caterpillars." Speaking of a remedy for these pests, Professor Riley says, "It so happens, fortunately, that there is one thoroughly simple, cheap, and efficacious remedy applicable to all four of these tree-depredators. They all begin their work very much at the same season, or as soon as the leaves are fairly developed; and arsenical mixtures properly sprayed on the trees about the middle of May, and repeated once or twice at intervals of a fort-

night later in the season, will prove an effectual protection to trees of all kinds."

— A committee of the Association of German physicians has sent a circular to the directors of all the gymnasia of Germany, asking them to dissuade students from adopting the medical profession. Accompanying the circular are statistics which show the proportion between the number of physicians licensed each year and the number who die or retire from the profession.

— A second edition of Lancaster's 'Liste des observatoires et des astronomes' has appeared. We are glad to learn that there is a prospect of further editions being published, as they may be required to keep pace with the movements of astronomers. This little directory will be found useful not only by astronomers, but by booksellers and others who may wish to be put in communication with the astronomical world. The index contains about a thousand names.

— Trübner & Co. announce the first volume of the 'Reports of the Archeological survey of southern India, the Amarāvatī and Jaggayyapeta Buddhist Stūpas,' by James Burgess, director-general of the Archeological survey of India; together with transcriptions, translations, and elucidations of the Dhauli and Jaugada inscriptions of Asoka, by Prof. G. Buhler, Vienna. Dr. Burgess, the director-general of the Archeological survey of India, is just finishing a volume on the Amarāvatī and Jaggayyapeta Stūpas, illustrated by more than fifty collotype and lithographic plates and numerous woodcuts. It will be remembered that the second part of the late Mr. James Fergusson's 'Tree and serpent worship' (now out of print) dealt with the marble sculptures brought by Col. C. Mackenzie and Sir Walter Elliot at different times from the Amarāvatī Tope or Stūpa, and which are now in the British museum. Dr. Burgess spent some time at Amarāvatī immediately after the excavation of the site by orders of the Madras government, where he made further researches, discovering about ninety fresh sculptures, and forwarded about a hundred and eighty slabs to the Madras government museum, which he also carefully photographed. On the spot he made many drawings, and copied all the Pali inscriptions, which are numerous, and, though short, are of considerable interest. One in particular he discovered, bearing the name of Pulumāyi, one of the great Andhra sovereigns of the second century, which is of the utmost value in determining the age of the Tope. The date of the monument proves to be earlier by about a century and a half than Mr. Fergusson had estimated it; but this seems to be solely due to the

want of date, when the latter wrote, by which to fix the age of the Nasik inscriptions of the Andhra kings. It is one evidence of the value of the epigraphical researches by the Archeological survey that they enable scholars to determine, within so very narrow limits as Dr. Burgess is understood to prove, the age of so interesting a monument as this of Amarāvatī. At Jaggayyapeta, a large village farther up the Kistna River, and close on the Hyderabad frontier, Dr. Burgess discovered another ruined Stūpa. This is also described and illustrated, and the inscriptions from it translated. Though much smaller than that at Amarāvatī, it proves to be of much earlier date ; and its very archaic sculptures, though few and much injured, are of the greatest interest in the illustration of early Indian art. The work is all in type, and only waits the completion of some of the plates, which may be expected within a short time.

— The garbage crematory at Wheeling, W. Va., is said to be completed, and to have stood the tests which have been applied, to the satisfaction of the authorities. Pittsburgh, Penn., is also endeavoring to solve the difficult problem of the disposal of garbage, and has advertised for bids to construct furnaces. We regret to learn that the Milwaukee, Wis., authorities have decided to remove the garbage of that city to the country, and there bury it in the ground. Such a method of disposal is, at the best, unsanitary, and can be but a temporary relief.

— Dr. Albert Kellogg, the pioneer botanist of the Pacific coast, and the last surviving charter member of the California academy of sciences, died at Alameda, March 31, 1887.

— The U. S. coast-survey parties on the Pacific coast are now all in the field. Assistant Pratt, on the west coast of Washington Territory, will complete the astronomical and plane-table reconnaissance from Cape Flattery to Gray's Harbor, over a region which has been traversed by few persons, and has been absolutely unsurveyed except for the hydrographic reconnaissance made by Captain Alden early in the fifties. The preliminary astronomical and topographical reconnaissance and survey along the coast of Washington Territory from Columbia River to Port Orford, under the charge of Assistants Rockwell and Dickens, will also be completed this year. The magnetic apparatus at Los Angeles is giving splendid results, almost unbroken curves having been maintained at this station for several years. Every great earthquake which has occurred has affected the magnetic elements, and has been faithfully recorded, some of the waves in lines of the record being quite remarkable. The steamer Blake, on

her way from the Gulf Stream explorations which have been in progress on the south of Key West, will call at Brunswick harbor, Georgia, and make an examination of that bar, at the request of citizens interested in the progress of the port. The Blake will also stop at Cape Fear, and will make a hydrographic survey in that vicinity, where remarkable changes have occurred in the last twenty years. Two topographic parties and one hydrographic party are now at work on the coast of Maine in the vicinity of Cobscook Bay. The surveys on this coast are rapidly approaching completion.

— Commercial Agent Smith reports from Mayence that the peronospora, which is a pest as rapacious as the phylloxera, has made its appearance in the vineyards of Germany, threatening to accomplish on the Moselle and Rhine what the phylloxera has failed to effect,—the destruction of the vineyards on the banks of those rivers ; and the vine-dressers are filled with alarm for the future. The chamber of commerce at Coblenz has called the attention of the government at Berlin to the pest, and asks that the remedy adopted in America, of burning the leaves upon which the insect has fixed itself, be employed by the police.

— The navy department has just issued a fine submarine cable chart of the world.

— The U. S. fish commission sent a car last week with 4,000,000 shad-eggs and 1,500,000 shad-fry to New York state for stocking the waters of the Hudson River.

— The international convention just ratified by the President, securing patentees in the United States the right to take out patents in other countries at any time within seven months after letters have been issued to them by our government, confers a privilege which will be highly valued by inventors.

— Lieut. John P. Finley of the signal office has just issued a new publication on the subject of tornadoes.

— Gen. A. W. Greely, chief signal officer, has received from the secretary of war a gold medal presented to him by the Paris geographical society, in recognition of his valuable contributions to the knowledge of high latitudes.

— In May, 1887, Messrs. Ticknor & Co. begin the publication of a set of handsome and convenient paper-covered volumes, for leisure-hour and summer-day reading, to be made up of some of the choicest and most successful novels of late years, together with several entirely new novels by well-known and popular writers. They will be issued regularly, once a week, for three months.

— Prof. W. G. Peck, LL D., is writing an 'Analytical mechanics' for the use of colleges and scientific schools, embracing the course as now taught at the School of mines, Columbia college. Messrs. A. S. Barnes & Co. will publish it in the early summer.

— Messrs. Ticknor & Co. announce for publication 'The Nigritions,' division 1 of 'The social history of the races of mankind,' by A. Feathermann; also 'The Melanesians,' division 2 of 'The social history of the races of mankind,' by A. Feathermann. These two learned volumes are parts of the great group which was begun by the publication of 'The Aramaeans' two years ago. When all the volumes of 'The social history of the races of mankind' shall have been published, the work will be found to be a comprehensive history of universal civilization, embracing not only the civilized and most enlightened nations of the earth that exist now, or had existed in the remotest ages, but treating equally of savage and barbarous races, tribes, and nations, such as are historically known to have existed in ancient time, and such as exist now in Africa, Oceanica, America, in the north of Europe, and in many parts of Asia.

#### LETTERS TO THE EDITOR.

\* \* \* The attention of scientific men is called to the advantages of the correspondence columns of SCIENCE for placing promptly on record brief preliminary notices of their investigations. Twenty copies of the number containing his communication will be furnished free to any correspondent on request.

The editor will be glad to publish any queries consonant with the character of the journal.

Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

#### The cause of consumption.

In regard to the so-called 'theory of consumption' developed by Hambleton, as described in a recent number of *Science* (ix. No. 221), I think that our knowledge of the cause of tuberculosis is now so definite and precise that communications of that nature are positively pernicious, if not made with more discrimination, because they confound the cause of the disease with the favoring or retarding influences under which it may progress, and thus draw off attention from one of the most important measures which must be taken to guard against the contraction and perpetuation of the disease.

It is now definitely established that tuberculosis is caused, and caused alone, by the presence and action in the body of the bacillus tuberculosis. Tuberculosis can no more appear in the body without the previous entrance of the bacillus than a crop of corn can spring up in the soil without the previous deposition in some manner of the seed. And to gravely discuss the probability of tuberculosis originating in the body from any set of conditions not associated with the bacillus tuberculosis is precisely analogous with speculations as to the conditions of soil, climate,

etc., which could cause a crop of corn to spring up spontaneously in a field.

As your correspondent 'Medicus' points out, Hambleton's array of facts affords strong confirmatory evidence of the infectious nature of the disease, and shows the important influence on the development and progress of the disease of certain external conditions of individuals and people.

Before the discovery of the bacillus tuberculosis, such hypotheses as Hambleton's were frequently elaborated, and were useful as the best which could be done at the moment. The facts upon which they were based are still more useful to-day, but conclusions from them should not be permitted to assume a false relationship to the real causative agent in tuberculosis.

At present it does not seem probable that tuberculosis, when once definitely established in the body, can be successfully combated by the administration of drugs for the direct destruction of the bacilli, although new methods of treatment based upon this possibility are frequently suggested, and find one after another a short-lived currency. It appears very doubtful whether the body can be sufficiently saturated with any form of germicide to insure the complete destruction of the bacilli without destroying the life of the individual.

But, on the other hand, much has been, and much more may still be, done in the way of assisting the cells of the body in their natural warfare against the invaders; as by the supply of suitable foods and the furnishing of favorable hygienic and climatic conditions. Heredity is, without doubt, an important element in the origin and progress of the disease, but it is unquestionably not a directly etiological but only a secondary determining or accessory factor.

When the public and the members of the medical profession are sufficiently impressed with the overwhelming importance of the primary infection of the body with the bacillus tuberculosis — apparently in most cases from inhalation with dust of the bacillus or its spores — in the causation and perpetuation of the disease, and are thereby led to urge and practise the universal destruction or disinfection of sputum and all other discharges from tuberculous individuals, we shall have taken the first step towards what appears to be our only real and well-grounded hope of effectually stamping out the disease. The safeguards which we provide, or ought to provide, against the invasion of Asiatic cholera, consist in the destruction of the bacterium which causes it, and although far more difficult of accomplishment, owing to its constant and universal presence, this is the task to which we must address ourselves in the face of the far more important disease, tuberculosis.

In the event of an invasion of Asiatic cholera, we should indeed consider and attempt to guard against those conditions which seem to render an attack of the disease more likely, such as digestive disturbances, over-exertion, etc., and we should bring all accumulated experience to bear upon the conduct of the disease in the individual to a successful termination. But, after all, the main direction of our efforts would lie in precautions against its spread, and the speedy stamping-out of the disease by rigid disinfection of all excretory material. In other words, while the conduct of individual cases would not be neglected, we should realize that in the wider task of total eradication lay our chief duty.